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Docket No.: SB-488

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MAIL STOP: APPEAL BRIEF-PATENTS

By: ______________________ Date: September 25, 2003

15 appeal notice 10/7/03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

Applic. No.	:	10/026,494	Confirmation No.:9282
Applicant	:	Norbert Dreer et al.	
Filed	:	December 19, 2001	
TC/A.U.	:	3725	
Examiner	:	Daniel C. Crane	
Docket No.	:	SB-488	
Customer No.	:	24131	

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BRIEF ON APPEAL

Commissioner for Patents
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection in the Office action dated June 6, 2003, finally rejecting claims 1-8.

Appellants submit this *Brief on Appeal* in triplicate, including payment in the amount of $320.00 to cover the fee for filing the *Brief on Appeal*.

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Real Party in Interest:

This application is assigned to Plansee Aktiengesellschaft of Reutte/Tirol, Austria. The assignment will be submitted for recordation upon the termination of this appeal.

Related Appeals and Interferences:

No related appeals or interference proceedings are currently pending which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

Status of Claims:

Claims 1-8 are rejected and are under appeal. No claims were cancelled.

Status of Amendments:

Claims 1, 6, and 8 were amended after the final Office action. An amendment under 37 CFR § 1.116 was filed on August 14, 2003. The Primary Examiner stated in an *Advisory Action* dated September 2, 2003, that the amendment after final would be entered upon the filing of a *Notice of Appeal.*

Summary of the Invention:

As stated in the first paragraph on page 1 of the specification of the instant application, the invention relates to a tungsten/heavy metal alloy for tools and to a method of hot-forming or warm forming copper and copper alloys with such tungsten/heavy metal alloys.

Appellants explained on page 7 of the specification, line 5, that extrusion dies for the extrusion of rectangular sections with a cross section of 41.5 x 12 mm^2 were produced from a tungsten/heavy metal alloy according to the invention. The alloy contained 82% by weight of tungsten, 8% by weight of nickel, 4% by weight of iron and 6% by weight of chromium. To do this, the corresponding metal powders, with a mean grain size of 4 to 8 μm, were mixed and were compressed by means of die presses to form suitable blanks. Then, the blanks were sintered under hydrogen at approximately 1500°C for 2 hours, forming a liquid phase. The sintered blanks were then given the desired final dimensions by machining.

Example 2

Appellants further explained on page 7 of the specification, line 18, that, for comparative tests, extrusion dies made from a tungsten/heavy metal alloy according to the prior art containing 92% by weight of tungsten, 4% by weight of nickel, 2% by weight of iron and 2% by weight of chromium were produced in the same way as in Example 1.

Example 3

Appellants outlined on page 8 of the specification, line 12, that, once again for comparative tests, extrusion dies having the same dimensions and extruded sections as in Example 1 were machined from a commercially available semi-finished product made from the high-temperature resistant alloy Inconel® 718.

Comparative tests

Appellants also outlined on page 8 of the specification, line 8, that, to compare the individual extrusion dies with one another, the Vickers hardness (VH) of each alloy was measured at room temperature, oxidation tests were carried out at 900°C for five (5) hours in air, and extrusion tests using copper at a forming temperature of 875°C and a reduction in cross section of 1:150 were carried out.

As further stated on page 8 of the specification, line 15, in Examples 1 and 2, reworking was in each case carried out on the extrusion dies by polishing the extrusion die if the surface quality of the extrudate was insufficient on account of excessive formation of grooves. The end of the service life of the extrusion dies was reached when the dimensional deviations on the extrudate caused by the reworking were excessive.

Appellants outlined in the last paragraph on page 8 of the specification, line 23, that, in Example 3, the end of the service life resulted from edge cracks in the die, which first became visible after just 16 extrusion operations and became continuously more pronounced.

References Cited:

U.S. Patent No. 3,988,118 to Grierson et al. (Grierson), dated October 26, 1976.

Issues

1. Whether or not claims 1-3, 6, and 7 are anticipated by Grierson et al. under 35 U.S.C. § 102(b).

2. Whether or not claims 4, 5, and 8 are obvious over Grierson under 35 U.S.C. § 103.

Grouping of Claims:

Claims 1, 6, and 8 are independent. Claims 2-5 depend from claim 1. Claim 7 depends from claim 6. The patentability of claims 1, 6, and 8 is individually and separately argued. Therefore, claims 1, 6, and 8 stand alone and do not stand or fall with any other claim. Claims 2-5 stand or fall with claim 1. Claim 7 stands or falls with claim 6.

Arguments:

Anticipation – 35 U.S.C. § 102(b).

We are guided here by case law which, in the context of anticipation, is quite settled. That is, it is well understood that "anticipation is established only when a single prior art reference discloses, expressly or under principles of inherency, each and every element of a claimed invention." RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 221 USPQ 385 (Fed. Cir. 1984). In order to carry his burden of showing that a prior art reference anticipates, the Primary Examiner must show that the claimed invention is shown/taught in its entirety by the prior art reference.

We will show in the following that the Examiner has clearly not met his burden and that the rejections are in error. It appears, however, that the rejections are not so much based on the Examiner's incorrect application of the guiding case law, but on an interpretation of the claims which differs considerably from appellants'

interpretation. That is, the appeal appears to hinge on the proper reading of the appealed claims.

The claims emphasize the fact that the invention deals with a tool that is used for "hot forming." As defined in the specification, the term "hot forming" pertains to the forming of metals and alloys in their solid state. See page 1, lines 12-16. In order to clarify the term, the expression "solid state" appears in each of the independent claims as well.

The "solid state" requirement appears in the body of claim 1, in that the tool body of the claimed article must be formed the "receive . . . in the solid state."

Claim 6 incorporates the requirement that the metal to be formed in the claimed tool be in its solid state in the body of the claim. In the claimed method, we provide the workpiece "in a solid state" and the workpiece is subjected to the tool while the workpiece is in the solid state.

Turning now more specifically to the art rejection, the Examiner correctly recognized that the alloy composition of the reference Grierson and that of the claims overlap. As noted above, however, the appealed claims are directed to the use of the alloy for tools used for hot forming (i.e., solid state processing) of copper and copper alloys.

The reference to Grierson does not pertain to the hot forming of solid metal bodies. Instead, the reference pertains to metal melts and the die casting of such metals.

Grierson point out that the improvements obtained with the invention pertain to the following:

> alloys which have increased resistance to thermal fatigue.
>
> alloys which have increased resistance to corrosion.
>
> shaping members which will operate at higher temperatures.
>
> die casting dies or molds, cores and other metal shaping members which have a long life.
>
> die casting dies, molds, cores, core pins and other metal shaping members which will be resistant to erosion when subjected to the washing action of molten metals and alloys . . . .

Grierson et al., col. 1.

> casing dies, and other shaping members which will resist cracking or spalling when subjected to the thermal stresses created by molten metals and alloys being forced into dies and molds under pressure.

Grierson et al., col. 2, lines 2-5.

In short, Grierson provides for a tool into which molten metal is poured, and the metal is subsequently cooled to change its phase to the solid phase.

Claim 1 is not anticipated under 35 U.S.C. § 102, because the reference does not have a tool body "formed to receive . . . in the solid state."

Claim 6 is not anticipated under 35 U.S.C. § 102, because the reference does not teach or imply a step of "providing . . . in a solid state and subjecting . . . in the solid state."

Obviousness – 35 U.S.C. § 103.

Claim 8 is an improvement claim. As such, it contains the "solid state" limitation in the preamble and it is imported as a limitation in the claim as a whole. In other words, the nature of claim 8 as an improvement claim incorporates the "solid state" requirement as a feature of the claim.

Claim 8 is not obvious over Grierson under 35 U.S.C. § 103, because the reference does not pertain to a "tungsten alloy for hot forming . . . in a solid state." That is, claim 8 defines an improved hot-forming tool, while that reference does not even remotely pertain to a hot-forming tool. Instead it pertains to a mold for receiving a poured melt.

The objects pursued by Grierson pertain to melt casting and not to hot forming. The patent further explains, with reference to an exemplary embodiment, that:

> Tests have been conducted on various tooling components such as die casting dies, core pins, plungers, sprue pins, etc. In a typical die casting die wherein brass castings were formed . . . .
>
> The temperature of the brass was about 1750° F.

Grierson et al., col. 7, lines 6-9 and 11-12.

While the reference mentions "extrusion" and "hot-forging" and "dies and other shaping members", it is entirely clear that the reference pertains only to high temperature molten metal applications.

The tools of the reference come into contact with molten metal and they are primarily exposed to corrosive oxidation and to erosive loading. The tools of the reference Grierson, therefore, are subjected to entirely different exposures as compared with the tools of the claimed invention. Furthermore, Grierson not only mentions copper and copper alloys, but also mentions as equivalents ferrous materials, aluminum and aluminum alloys, as well as zinc and magnesium and their alloys.

Those of skill in the art could therefore not pick and choose from the reference and condense therefrom a teaching which goes specifically to the utilization of the claimed alloy in the hot forming of copper and copper alloys. There is, therefore, no teaching in Grierson that specifically pertains to advantages in the hot forming of copper and copper alloys.

The prior art of hot forming copper and copper alloys utilized tools formed of entirely different alloys, such as Inconel® or Stellite® or tungsten-heavy metal alloys of a different composition. As explained in the specification, the use of such alloys in such tools lead to strong scoring at the tool surface and to the formation of edge tears during the forming of corner profiles.

Against this background, appellants provide an entirely new and unobvious product and a method that utilizes a tungsten/heavy metal alloy which may be known in another context (e.g., the melt mold of Grierson), but which is not known or obvious in the claimed context.

The invention is claimed in a variety of different approaches. In each of the independent claims, there is provided a solid state "raw material body" which is subsequently hot-formed in the claimed tool. The copper or copper alloy, in the context of appellants' invention, is in the solid state throughout the process. The material to be formed in the context of the prior art reference Grierson, on the other hand, is first introduced in the liquid melt state and then transforms into the solid state.

We are mindful of the fact that these sweepingly broad statements must be specifically supported in the individual claims and the wording of the individual claims must be distinguished from the prior art references. In once more summarize the claim set as follows:

- Claim 1 is an article claim written as a combination claim of a composition. In addition, the composition is written in the closed form ("essentially consisting of").
- Claim 6 is a Jepson-type claim. That is, we define here a hot-forming process for copper and copper alloys wherein the improvement is found in the utilization of a tool whose composition is novel.
- Claim 8 is also a Jepson-type claim in which the tungsten alloy is used for hot-forming (i.e., molding in the solid state) copper and copper alloys. The improvement, again, is found in the composition of the tool and the fact that this composition is utilized in the context of a hot-forming process.

In contrast with the claimed invention, the molding tool according to Grierson is suitable for transposing liquid materials to a solid state. That is, the materials to be

formed are formed via their transition from the liquid melt state to the solid state without a mechanical-type forming. That is, Grierson does not pertain to hot-forming. The tool in the Grierson process is subject to corrosive attack from the melt. It is subjected to mechanical stresses to only a minor extent.

The hot-forming tool according to the present invention, where the materials to be formed are in their solid state at all times, is primarily subject to mechanical and erosive stress. The resistance of the tool to corrosive attacks is entirely uncritical in this context.

It is further pointed out that the instantly claimed invention makes use of a considerably narrower range in the composition materials as compared to Grierson's alloy range. As noted above, the claims of the instant application are carefully limited to their application for copper and copper alloy forming. These two differences, while not distinctively establishing a separate invention in and of themselves, must nevertheless be considered as inventive steps that further distinguish over the prior art.

Appellants' further request consideration of one additional argument. The reference to Grierson was published more than 25 years ago. In spite of Grierson's disclosure, however, the tools used for hot-forming in Europe – the Grierson protection did not reach to Europe – were formed of material such as Inconel® steel or Stellites® and to a considerably lesser degree tungsten heavy-metal alloys well outside of Grierson's composition range. In other words, while Europe was entirely free to copy the Grierson process or the Grierson tools in the context of hot-

forming, such was not done until applicants provided their disclosure. Had the claimed tool and process been obvious over Grierson, as maintained by the Examiner, the art would have introduced the same in Europe. This, however, is not the case. Instead, appellants indeed provided an improvement over the prior art and appellants provide claims herein which clearly distinguish over the prior art.

The honorable Board is therefore respectfully urged to reverse the final rejection of the Primary Examiner.

Respectfully submitted,

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For Appellants

WHS/bb

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Appendix - Appealed Claims:

1. A tool for hot-forming copper and copper alloys, comprising a tool body formed to receive copper or a copper alloy in the solid state and a tungsten/heavy metal alloy consisting essentially of 80 to 89.9% by weight of tungsten, 2 to 7% by weight of chromium, and a remainder of a binder metal.

2. The tool according to claim 1, wherein said binder metal in said tungsten/heavy metal alloy is at least one binder selected from the group consisting of nickel and iron.

3. The tool according to claim 1, wherein said tungsten/heavy metal alloy consists of 82 to 85% by weight of tungsten, 4 to 6% by weight of chromium, and 9 to 14% by weight of said binder metal selected from the group consisting of nickel and iron.

4. The tool according to claim 1, wherein said tungsten/heavy metal alloy is configured to form an extrusion die.

5. The tool according to claim 1, wherein said tungsten/heavy metal alloy is configured to form an extrusion mandrel.

6. In a method of hot-forming copper and copper alloys, the improvement which comprises providing one of the copper and copper alloys in a solid state and subjecting the copper or copper alloy in the solid state to a tungsten/heavy metal alloy consisting of 80 to 89.9% by weight of tungsten, 2 to 7% by weight of chromium, and a remainder of a binder metal.

7. The method according to claim 6, which comprises subjecting the copper or copper alloy in the solid state to a die consisting of 82 to 85% by weight of tungsten, 4 to 6% by weight of chromium, and 9 to 14% by weight of said binder metal selected from the group consisting of nickel and iron.

8. In a tungsten alloy configured for hot-forming copper and copper alloys in a solid state, the improvement which comprises an alloy formed of 80 to 89.9% by weight of tungsten, 2 to 7% by weight of chromium, and a remainder of a binder metal material, bound to form a tool for receiving copper or a copper alloy in the solid state and hot-forming copper and copper alloys in the solid state.